

Epidemiological Situation of Dengue in Thailand

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Abstract : Dengue haemorrhagic fever is one of the major infectious diseases in Thailand with trend to increase morbidity in its subperiodic fluctuations. All provinces were infected and more prone in Bangkok and other dense populated provinces in the North East. Recently Nakhon Sri Thammarat province in the South was the second rank in morbidity due to the internal migration of labour from the North East to the South working in coffee and oil palm plantation thus causing the South to be the highest epidemic of Dengue in Thailand. Monthly incidences correlated with rain in whole Thailand, but no correlation with rain was found in Bangkok area. The non rain correlation were found in Bangkok and other large metropolis due to continuous supply of pipe water and habit of people storing water for domestic use. All 4 serotypes were found and 10% was one serotype causing primary dengue infection. Eighty to 90% were secondary dengue infection. The most common serotype was dengue 2. Both sexes were equally infected and more in young children than adult, 5–9 year were the most infected age group but there was trend to increase in older age group. Apart from classical dengue, DHF and DSS an extended dengue syndrome was discovered. It was characterized by encephalopathy and hepatic involvement and associated with dengue type 1, 2 and 3 or 4. In spite of dengue control for 20 years by space spraying with malathion by fogging and or ULV, health education during the outbreak and later on prophylactic spray and source reduction before or during the outbreaks, the rising trends is still observed. The community based *Aedes aegypti* control programs were launched with good result in some province eg. Phrae and the school children the most vulnerable age for dengue are now thought to be the most efficient way to achieve community participation goal.

Key words : Dengue haemorrhagic fever, extended dengue syndrome, encephalopathy, *Aedes aegypti*, *Aedes albopictus*, community participation.

INTRODUCTION

DHF first occurred in 1949 and epidemic in 1958 and then later distributed throughout Thailand. All 4 serotypes 1, 2, 3 and 4 were found. Apart from primary and secondary dengue haemorrhagic fever and dengue shock syndrome the encephalopathy and hepatic involvements are now increasing in Southeast Asia and South Pacific. A tendency

of increasing trend of DHF in older age groups were found in many regions.

The nature of human in congregation in a community, the domestic habit of the main vector *Aedes aegypti* and the association of *aegypti* breeding in artificial containers as a result of human activity creates more transmission potential from man to vector and from vector to man. Rain may indicate the transmission of DHF but several area were non rain correlation from habit of human being storing water for domestic uses. It is very important to study epidemiology and the epidemiological situation every year from each country. The control and eradication program after the appropriate and right epidemiological studies would be efficient.

MATERIALS AND METHODS

Sources of information were obtained from the Department of Communicable Disease Control Bangkok, Thailand.

RESULTS

Epidemiological situation on dengue: DHF is one of the major infectious diseases in Thailand with trend to increase morbidity (45.9-325.1) in it's subperiodic fluctuations. The epidemic being in 1980, 1984, 1985 and 1987, it's rank followed diarrhea and malaria. The highest was in the South. Mortality rates were low 0.2-1.9.

DHF first occurred in 1949 and epidemic in 1958 and then later distributed throughout Thailand. All provinces were infected and more prone in Bangkok (12, 244), Nakhon Si Thammarat (8,659), Nakhon Ratchasima (7,173), Buri Ram (6,437), Udon Thani (6,353), Chiang Mai (5,862), and Sakon Nakhon (5,071) and less prone in Mae Hong Son (1), Lampang (9), Phrae (16), Pattani (17) and Samut Sakhon (18). Both sexes are equally infected and more in young children than adult, 5-9 years were the most infected age group but there was trend to increase in older age group.

The increase incidence in the South was probably due to the internal migration of labour force from the Northeast working in coffee and oil palm plantations.

Monthly incidences correlated with rain started from May reach high incidences in June, August and dropped in December. The incidences of non rain correlation were found in Bangkok and other large metropolis due to continuous supply of pipe water and habit of people storing water for domestic use. All 4 serotypes 1, 2, 3 and 4 were found but 10% is one serotype caused primary dengue infection and 80-90% were secondary dengue infection. The most common serotype was dengue 2. CD4+ and CD8+ T cells, B and NK cell activation may contribute to the pathogenesis.

Apart from classical dengue, DHF and DSS an extended dengue syndrome was discovered. It is characterized by encephalopathy and hepatic involvement and associated with dengue virus type 1, 2 and 3 or 4 (Nisalak et al., 1990). Dengue virus antigen was demonstrated by indirect immunoperoxidase in the liver, spleen, lymph nodes and bone

Table 1. Reported cases of DHF and deaths in Thailand, by region, 1990-1992.

Region	1990		1991		1992	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Central	19,556	49	10,595	20	7,697	15
Northern	17,816	76	11,503	35	5,252	14
North-Eastern	29,350	153	19,525	55	16,223	53
Southern	25,273	136	2,159	9	7,313	31
Total	92,005	414	43,782	119	36,485	113

marrow with extensive coagulative necrosis, fatty metamorphosis; and Councilman-like bodies and mononuclear inflammatory cell infiltration in the liver.

Jatanasen, 1993 reported that the number of reported cases and deaths due to DHF/DF in Thailand reached its highest peak in 1987 when 174,285 cases were reported from the whole country. This was the thirtieth year of the outbreak of the diseases since 1958. However, in the following two years, the number of DHF/DF cases declined to 27,608 in 1988 and to 69,427 in 1989. But in 1990, the number of cases increase to 92,005 - a little over half of the level of reported cases of 1987. In 1991, the total number of reported cases decreased to 43,782 and further declined to 36,485 in 1992.

The following table shows the number of reported cases and deaths due to DHF in Thailand during the period 1990-1992.

The data showed that before 1990 the number of reported cases from the southern region was lower as compared to the other regions, but this increased in 1990.

In 1991, DHF cases reported from the whole country decreased, which showed a decline in the number of cases in each region. The pattern and the rank of the regional reported cases were normal to lowest in the southern region.

In 1992, the total number of reported DHF cases in the whole country was lower than the number in 1991 and so was the case in the north, north-eastern and central regions. But reported cases from the southern region did not decline, as was the pattern in the rest of the country. Instead, cases from this region increased about three times, compared to the figure in 1991. The marked increase in the number of cases reported from provinces in the middle part of southern peninsula was in Krabi, Nakorn Srithammarat, Surat Thani and Chumporn. The number of reported cases in the month of July 1992 was at nearly the same level of the reported cases in the whole of 1991. Intensive programs are needed for DHF cases and vector surveillance to investigate the marked increase in the number of reported cases from these provinces in the southern region of the country.

Epidemiological situation on vectors: *Aedes aegypti* the primary vector is anthropophilic, endophilic and endophagic. It breeds in the house in water jars for drinking and domestic use, ant trap, vase, flower pot plate, small jar, foot washing basin, and used tires.

Aedes albopictus another vector is more exophilic than endophilic and breeds in bamboo stumps, flower pot plate, coconut shell, can, used tire, cup for resin collection in rubber plantation, leave axil.

All provinces are infested with *aegypti* and *albopictus*. *Aegypti* were present in all good road communication but only some villages were positive for only *albopictus*.

There are evidences that monkeys may serve as jungle reservoir in West Malaysia and recently in Sri Lanka. African monkeys have also been found positive for dengue. Their role as reservoirs of the disease is unknown.

Control: Temporary eradication of *Aedes aegypti* is possible but it has not been possible to sustain eradication in the face of constant reintroduction from the area still infested. Insecticide resistance, which is wide spread in *Aedes aegypti* populations, also will make vector control more difficult. Vector control programs are frequently ineffective because they lack public cooperation or adequate funding.

Inspite of dengue control for 20 years by space spraying of malathion by fogging and or ULV, health education during the outbreak and later on prophylactic spray and sources reduction before or during the outbreaks, the rising trends of DHF is still observed. The community based *Aedes aegypti* control programs were launched with good result in some provinces e. g. Phrae and the school children the most vulnerable age for dengue are now thought to be the most efficient way to achieve community participation goal.

No specific chemotherapy is available for treating dengue or DHF/DSS. Efforts to develop an approved vaccine is on the way. The control therefore must depend on vector control. A combination of environmental sanitation and chemical control, or integrated control, are usually needed to control the vector. Unless a high degree of community participation is achieved, either as a result of voluntary cooperations or legal pressure, the control measures will also be necessary to reduce *Aedes* infestation to the lowest possible level.

DISCUSSION

The rising trend of DHF inspite of various control measures and efforts were put in, indicating that control of DHF or in a greater hope eradication is difficult. Re-introduction of the vector, *Aedes aegypti* is one factor making the sustainable control program impossible. Community participation in vector control especially source reduction in environmental manipulation and vector surveillance are the more applicable and efficient method if vector surveillance especially larval stage is done weekly. Expansion of community participation in a large community with the same effort and result with guidance from government in vector control specialist would bring DHF control to eradication.

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